(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 10 May 2002 (10.05.2002)

PCT

(10) International Publication Number WO 02/36446 A1

(51) International Patent Classification7: B65D 25/08

- (21) International Application Number: PCT/US01/45618
- (22) International Filing Date: 31 October 2001 (31.10.2001)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/244,934

1 November 2000 (01.11.2000) US

- (71) Applicant and
- (72) Inventor: VLODEK, James, A. [US/US]; 10950 Linn Court, LaGrange, IL 60525 (US).
- (74) Agents: SAMPLES, Kenneth, H. et al.; Fitch, Even, Tabin & Flannery, Suite 1600, 120 South LaSalle Street, Chicago, IL 60603 (US).

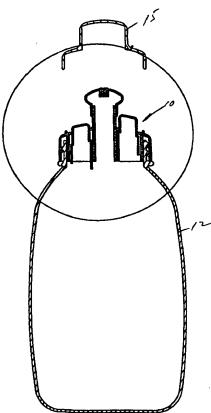
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO; NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

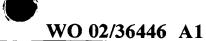
[Continued on next page]

(54) Title: CLOSURE WITH SELECTIVELY OPERABLE DISPENSE FEATURE



(57) Abstract: A closure (14) for a beverage receptacle (12) is provided with a selectively operable dispense feature. A plurality of hollow plungers (16) containing different additives are disposed in the closure (14) and are selectively operable to pierce a rupturable seal (36), permitting contents to be dispensed into the receptacle (12).

O 02/36446 A

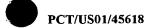




 before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

20

25



CLOSURF WITH SELECTIVELY OPERABLE DISPENSE FEATURE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims benefit of United States Provisional Application Number 60/244,934, filed November 1, 2000.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention is related to closures having selectively operable dispensing features, and in particular to such closures employed with beverage receptacles.

2. Description Of The Related Art

Various arrangements have been proposed for providing beverage containers with the ability to selectively add different ingredients to complete a beverage mixture. For example, United States Patent No. 4,785,931 discloses a molded plastic closure having integral stacking support ribs and rupturable mixed compartments. Despite advances, improvements in the art are continually being sought.

SUMMARY OF THE INVENTION

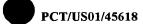
It is an object of the present invention to provide a closure having selectable dispensing features.

Another object of the present invention is to provide a closure of the above type for mating engagement with a beverage-containing receptacle.

A further object of the present invention is to provide a closure of the above-described type in which various additives can be mixed, one at a time, with the contents of the beverage receptacle.

10

20



These and other objects according to principles of the present invention are provided in a dispense enclosure for a fluid receptacle comprising:

a monolithic cylindrical body;

a plurality of plungers reciprocally mounted in said body; said plungers defining a hollow cavity for retaining the fluid additive;

said plungers further defining a lower edge portion for penetrating a breakable seal on said receptacle; and

a valve member disposed in said body, configurable between an open position for dispensing fluid from said receptacle and a closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

- FIG. 1 is a perspective view of a beverage closure and dispensing assembly attached to a receptacle;
 - FIG. 2 is a perspective view thereof with a protective cap applied;
 - FIG. 3 is a fragmentary perspective view thereof, shown in exploded form;
 - FIG. 4 is a fragmentary perspective view thereof;
 - FIG. 5 is a perspective view of the beverage closure and dispensing assembly, taken on an enlarged scale;
 - FIG. 6 is a perspective view showing the underside thereof;
- FIG. 7 is an exploded perspective view of the beverage closure and dispensing assembly and receptacle;
 - FIG. 8 is another exploded perspective view thereof;
 - FIG. 9 is a cross-sectional view taken along the ling 9-9 of FIG. 1;
 - FIG. 10 is an exploded perspective view showing the beverage closure and dispensing assembly and receptacle;
- 30 FIG. 11 is an elevational view thereof;

15

20



FIG. 12 is an elevational view of the beverage closure and dispensing assembly shown in combination with a receptacle and a protective cover;

FIG. 13 is a top plan view thereof;

FIG. 14 is cross-sectional view taken on the line 14-14 of FIG. 12;

FIG. 15 shows a portion of cross-sectional view 14, taken on an enlarged scale;

FIG. 16 is a fragmentary cross-sectional view taken along the line 16-16 of FIG. 17, showing another embodiment of a beverage closure and dispensing assembly with receptacle;

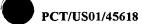
FIG. 17 is a perspective view of a receptacle shown with an alternative beverage closure and dispensing assembly according to principles of the present invention;

FIG. 18 is an exploded perspective view thereof;

FIG. 19 shows a portion of FIG. 17, taken on an enlarged scale; and FIG. 20 is a perspective view of the alternative beverage closure and dispensing assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, a beverage closure and dispensing assembly is generally indicated at 10. The beverage dispensing assembly includes a receptacle 12 for containing a fluid beverage component and a closure 14. As will be seen herein, closure 14 has selectable dispensing capability in order to provide different batches of beverage, or different flavored beverages, when mixed with the contents of receptacle 12. Closure 14 includes a plurality of plungers 16 disposed about a central valve member 18. Valve member 18 includes a collar 20 movable in vertical directions to open and close a valve passageway 22. Preferably, closure 14 includes a threaded cap portion 26 for engagement with a threaded finish 28 of receptacle 12. A protective cap 15 is shown in FIG. 3.



As can be seen in FIG. 1, plungers 16 include an upper closed end 30 resembling a push button for manual actuation by a user, to depress the plungers in a downward direction, toward receptacle 12. Referring to FIGS. 6, 7, and 10, it will be seen that the plungers 16 define a hollow interior cavity 32 and a lower end 34 for piercing a rupturable (foil) seal 36 affixed to receptacle 12. When the plungers 16 are depressed by a user, the plunger body is translated in a vertically downward direction, with the lower edge 34 piercing rupturable seal 36.

As indicated in the figures, four plungers are provided. Preferably, each plunger contains a different flavor additive which, when mixed with the contents of receptacle 12, produces a different flavored beverage. Upon recharging the fluid content of receptacle 12 a different plunger is depressed to pierce a different portion of the rupturable seal 36 and to mix with the receptacle contents to produce a different flavored beverage. The receptacle is subsequently re-charged and different plungers are depressed until additives in the closure have all been dispensed.

FIGS. 16-20 show a receptacle 12 in combination with an alternative beverage closure and dispensing assembly generally indicated at 100. A single plunger 102 dispenses an additive into the receptacle 12. A bottom edge 108 of the plunder pierces a rupturable seal, preferably in the form of a foil 110 (see FIG. 16).

As can be seen from the above, the present invention provides an interactive package concept that allows the end user to create his or her own "mix" for drinking. The flavor cap has 1-4 chambers loaded with different colorants and/or flavors. When the foil seal is punctured via the center shaft for single additive or any of four buttons for multiple additives, ingredients are dropped into a clear/base solution, e.g., water. Reaction of the two components can be varied to include an animated use of ingredients that move, change shape and color, etc., thus giving a visual value to the process of adding two or more components just prior to drinking.



Also, the ability to add fresh or time and light sensitive ingredients cam be accomplished with the same dynamic, e.g., powdered milk, baby formula, or vitamins, minerals and nutrients, even fresh fruit flavor.

Possibilities include, but are not limited to: sports drinks, fruit juice, flavored milk, pudding, soups and candy/novelty.

Caps may also be sold separately for additional use with reusable bottles with advantages geared for travel, camping, etc.

The drawings and the foregoing descriptions are not intended to represent the only forms of the invention in regard to the details of its construction and manner of operation. Changes in form and in the proportion of parts, as well as the substitution of equivalents, are contemplated as circumstances may suggest or render expedient; and although specific terms have been employed, they are intended in a generic and descriptive sense only and not for the purposes of limitation, the scope of the invention being delineated by the following claims.



What is claimed is:

1. A dispense enclosure for a fluid receptacle comprising:

a monolithic cylindrical body;

a plurality of plungers reciprocally mounted in said body;

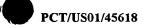
said plungers defining a hollow cavity for retaining the fluid

5 additive;

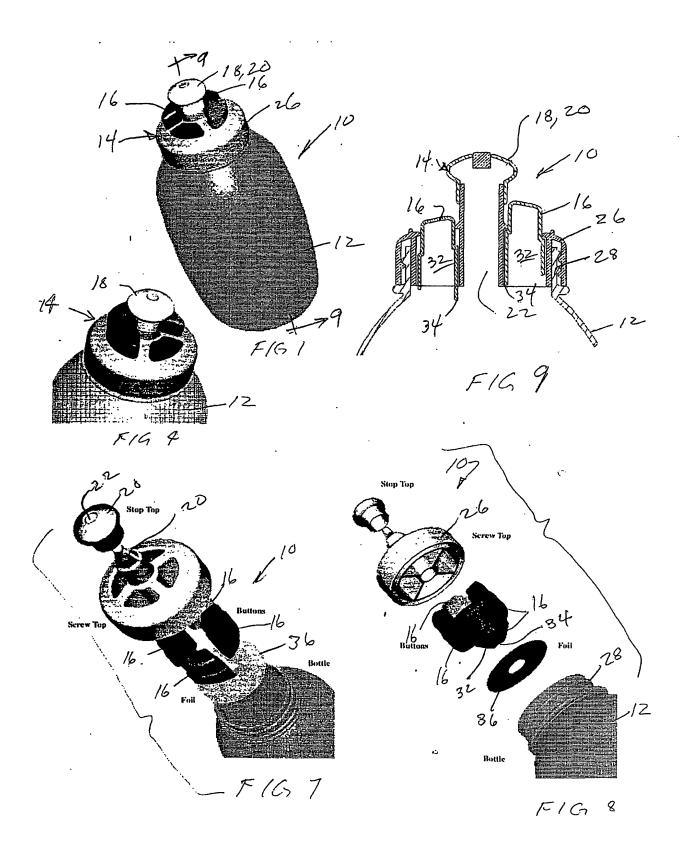
said plungers further defining a lower edge portion for penetrating a breakable seal on said receptacle; and

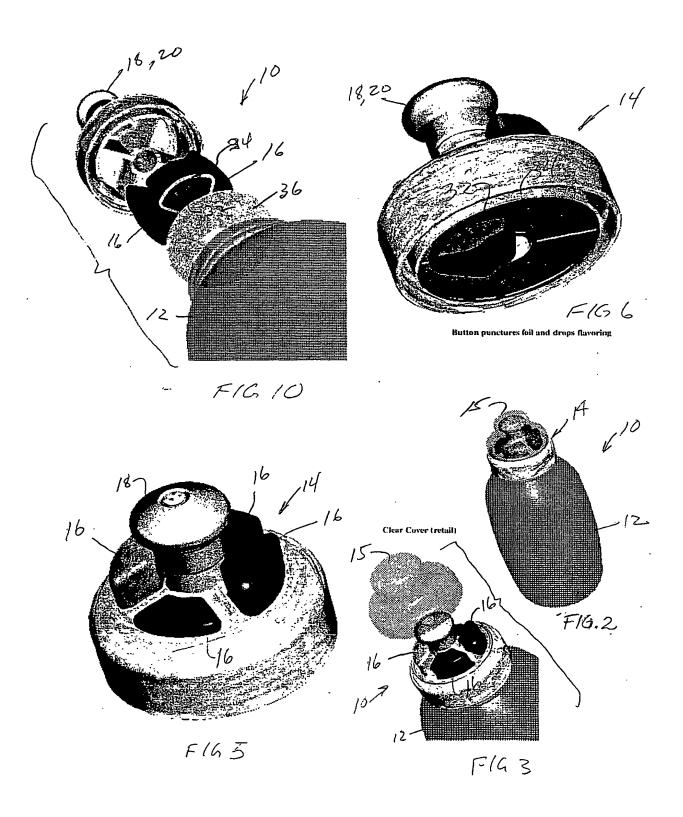
a valve member disposed in said body, configurable between an open position for dispensing fluid from said receptacle and a closed position.

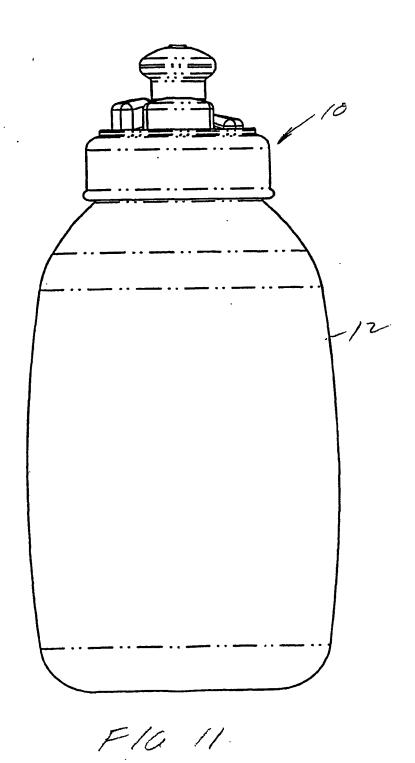
- 2. The enclosure of claim 1 wherein said plurality of plungers is disposed about said valve member.
- 3. The enclosure of claim 1 wherein said plungers are reciprocally movable in directions generally parallel to one another.
- 4. The enclosure of claim 1 wherein said body includes a threaded cap portion for engagement with a threaded finish of said receptacle.
- 5. The enclosure of claim 1 wherein said plungers have a generally wedge-shaped cross-section.
- 6. The enclosure of claim 1 wherein said valve member is disposed at the center of said cap, and said plungers are disposed about said valve member.

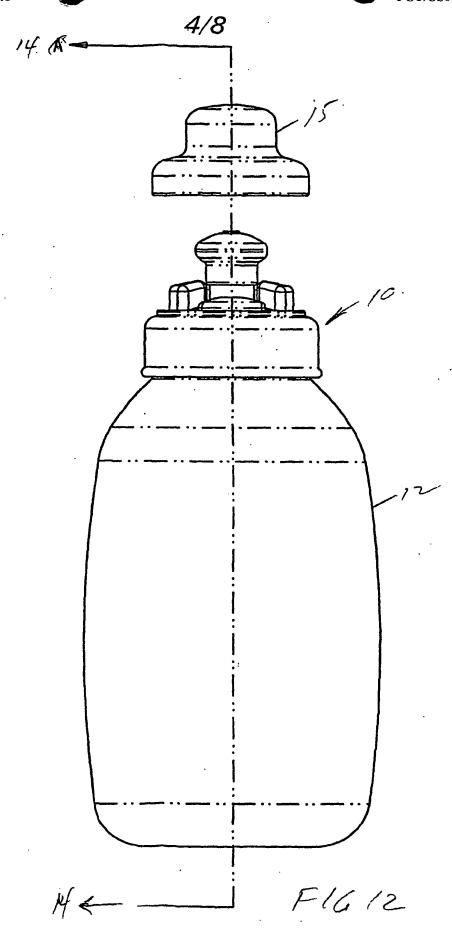


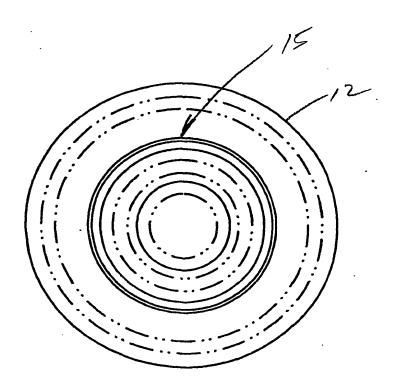
7. The enclosure of claim 1 wherein said plunders include an upper closed end for manual engagement by a user to depress said plungers toward said receptacle, penetrating said seal.



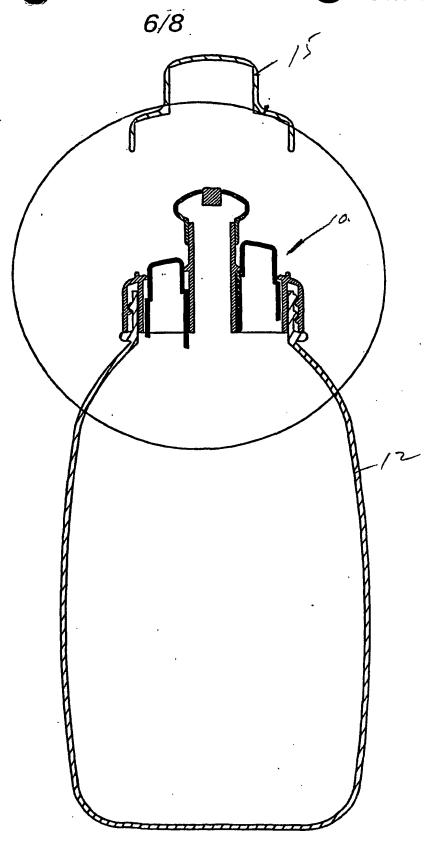




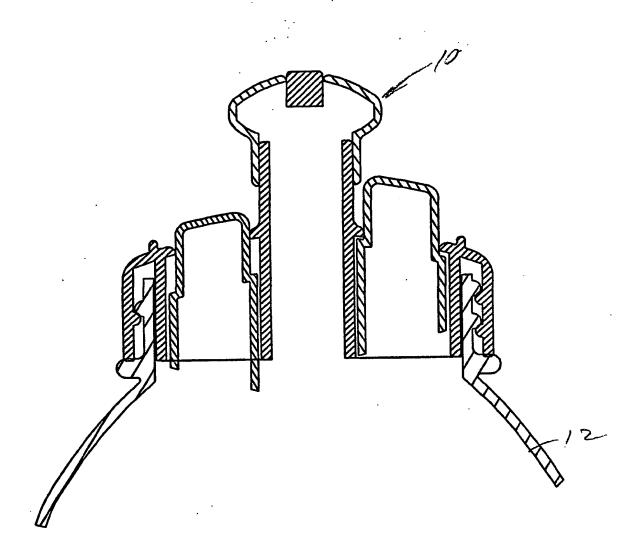




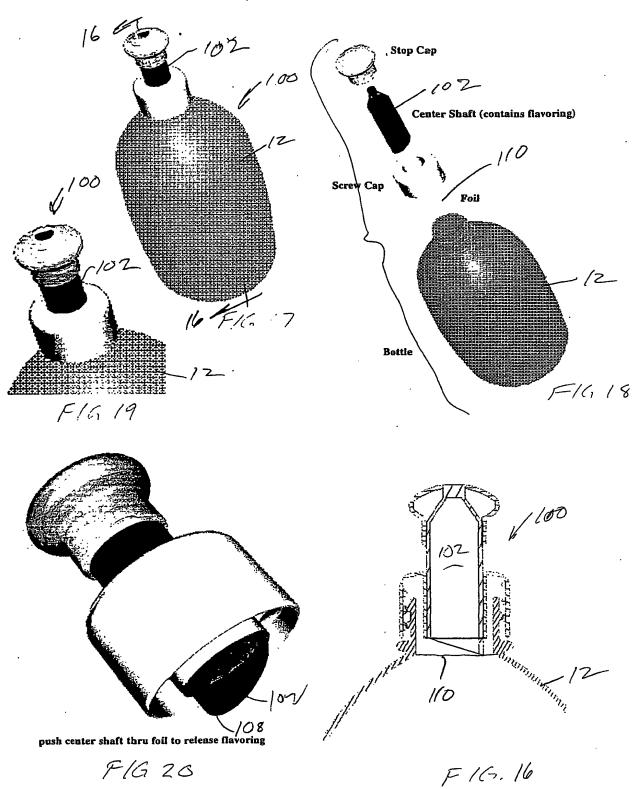
F14 /3



F16 14



F16 15







International application No. PCT/US01/45618

A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. B. Fuerther documents are listed in the continuation of Box C. See pacent family annex. Special exequence of feed documents and strategy of principle or others which may show document referring to an oral dictionary, was exhibition or other creames a political or or other creames and pairs or the same document which may show document referring to an oral dictionary, was exhibition or other creames politically piezo to the international search from the same plate family annex. Special exequence of the documents with indication or other creames and the principle or theory underlying the inventions are inventions as power to the same plate family annex. Special exequence of the documents with the continuation of Box C. See pacent family annex. 1 Lister document family annex. Special exequence of their documents with the continuation of Box C. See pacent family annex. 1 Lister document family annex. Special exequence political or or other documents with the surface of the serve which is a work of the serve which is a work of the serve which any draw dends on priority children for other creates and specially district or other creates and the serve which is a work of the serve which is a work of the serve which the serve which the serve which is a work of the serve which any draw dends on priority children, was a children or other creates and specially district or other creates and specially dended or other which is surface and the server which is a work of the server which any draw dended to be of priority and decounter politically pieze to the international search or priority in the statement of the same patest family and document referring to an oral dictionary, was children or other creates and specially dended or other which are surface and the server which is a work of the server patestally and the server which is a work of the server patestally and the server which is a work of the server patestally and the server which is a work of the server wh		SSIFICATION OF SUBJECT MATTER			
According to International Patent Classification (PC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S.: 2006/819-929; 216/6,288 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A. U.S. 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 1 A. U.S. 4,785,931 A (WEIR et al) 22 November 1988, see abstract. 1 U.S. 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 L. Supuda estegories of cited documents. Character document politication or other the international filing date. Character document politication or other the international filing date. Character document politication or other the international filing date. Character document politication or other the international filing date. Character document politication or other the international filing date. Character document politication or other the international search (accument politication or other the international search politication or other the international search politication or other search politication or other the international search politication or other the international search politication or proper inventors are document politication or other the international search politication of point or the international search politication of point or the internationa					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) US.: 200/210-292; 215/0,928 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 and 3 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 A US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 Ler document of the of parchite relevance to the art which is use confidence of the office of the columns of the particular decision of single cities or other aspeal reason (as specified). *** *** *** *** *** *** ***					
Minimum documentation searched (classification system followed by classification symbols) U.S.: 906/910-9998; 915/0,998 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A					
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 1 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 **Special categories of cled documents of consideration of the service					
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 and 3 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 Later decument defining the general state of the art which is not considered to be of practical relevance and constant which any through the publication date of another relevance to the state of the search of abstract of another decision or other system cause (sequelles) The document which may through other than the constitution of the protection of the protection of another decision or other system cause (sequelles) The document published prior to the international fling date but here when the document is a present skilled in the art which the publication and set of another decision or other system cause (sequelles) The document published prior to the international search The document published prior to the international fling date but here when the document is a present skilled in the art which the art which the published prior to the international search The document of prioritory relevance the elimination and the document is a present skilled in the art which the art which the state of the scrual completion of the international search The priority date of the scrual completion of the international search The document of prioritory relevance the elimination and the consideration and a present skilled in the art which the art which the scrual completion of the international search The document of prioritory relevance the chimen international search report The document of prioritory relevance the chimen and the considera					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 and 3 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 **Special categories of cited documents or content of the principle or the international filling date or document defining the general state of the art which is not conducted to be of principle or the ory suderlying the invention cannot be conducted to be of principle or the ory suderlying the invention cannot be conducted to the organization of cited or washlish deep pulse of the conduction of the international filling date to the principle or theory suderlying the invention cannot be conducted to the organization or other conduction or which may form whether the construction or other conduction or washlish date qualification date of another distinct or other means the conduction of the international filling date to the conduction of the international filling date to the principle or the conducted to involve an invention sense the claimed invention cannot be considered to a conducted to involve an invention sense to describe the document of particular relevance, the claimed invention cannot be considered to involve an invention sense the document to be found to the document of particular relevance, the claimed invention cannot be considered to involve an invention sense to the document to be found to the document to	(.2. ; 700\10-747; 712\0'748				
C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 and 3 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 Lus 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 Late-focument published after the international fling date conditions of the sund not in online with the application late visited to understand the principle or deavy underlying the invention of the sund not in online with the application test visited to sunderstand the principle or deavy underlying the invention of the sublish the publication due of another citation or other ments "It document referring to an oral disclosure, use, exhibition or other ments "It document referring to an oral disclosure, use, exhibition or other ments "It document referring to an oral disclosure, use, exhibition or other ments "It document ments and documents, such combination in the priority date claimed Date of the nectual completion of the international fling date but later "gr." Date of the nectual completion of the international search 20 FEBRUARY 2002 Name and mailing address of the ISA/US					
Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 1 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. A US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 ** Special categories of cited documents: document defining the general state of the art which is not confidered to be of precisional relevance which may throw doubte on priority claim of the property of another citation or other special reason (as specified) or which is special reason (as specified) another citation or other special reason (as specified) and the property of particular relevance the claimed lavoration cannot be considered to be of precision and the property date claimed. The combined when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document invention constituted to involve an inventive step when the document is considered to involve and invention cannot be considered to involve and inv	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
A US 4,785,931 A (WEIR et al) 22 November 1988, see columns 2 and 3 A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1 Special categories of cited documents: 1 document defining the general state of the art which is not considered to be of protricular relevance, the cited to considered to be of protricular relevance in the cited to considered to be of protricular relevance in the cited to considered to be of protricular relevance in the considered to be of protricular relevance in the considered to have a protrict political relevance in the considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to the near the particular relevance, the claimed invention cannot be considered to involve an inventive step when the document to the near the considered to involve an inve	C. DOCUMENTS CONSIDERED TO BE RELEVANT				
A US 4,024,952 A (LEITZ) 24 May 1977, see abstract. I US 5,788,369 A (TSENG) 04 August 1998, see abstract. * Special categories of cited documents document defining the general state of the art which is not considered to be of particular relevance published are not principle of particular relevance published on a first discussion or other special reason (as specified) or which is other document defining the general state of the art which is not considered to be of particular relevance published on or after the international filing date or priority considered to be of particular relevance in principle or manufacture of particular relevance the claimed invention cannot be of the considered to involve an inventive at a positive specified) **Y* document which may throw doubts on priority clain(o) or which is other document is taken alone document referring to an oral disclosure, use, exhibition or other measure and particular relevance; the claimed invention cannot be considered to involve an inventive at positive to a provide an inventive and inventive and inventive and invention cannot be considered to involve an inventive and the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US	Category*	Citation of document, with indication, where ap	propriate, of the relevant passages	Relevant to claim No.	
LUS 5,788,369 A (TSENG) 04 August 1998, see abstract. Further documents are listed in the continuation of Box C. See patent family annex.	A		vember 1988, see columns 2	1	
Further documents are listed in the continuation of Box C. * Special categories of cited documents: *A" document defining the general state of the art which is not considered to be of particular relevance of the art which is document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O" document referring to an oral disclosure, use, exhibition or other means *P" document referring to an oral disclosure, use, exhibition or other means *P" document published prior to the international filing date but later *A" document referring to an oral disclosure, use, exhibition or other means *P" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document published prior to the international filing date but later *A" document member of the same patent family *Date of mailing of the international search report *A PPR 2002 *Authorized officer	A	US 4,024,952 A (LEITZ) 24 May 197	77, see abstract.	1	
Further documents are listed in the continuation of Box C. See patent family annex. * Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance *E" earlier document published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search Date of the actual completion of the international search PAPR 2002 Name and mailing address of the ISA/US See patent family annex. "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is considered to involve an inventive step when the document is considered to involve an inventive step when the document being obvious to a person skilled in the art document member of the same patent family Date of mailing of the international search report APPR 2002 Name and mailing address of the ISA/US Authorized officer	A	US 5,788,369 A (TSENG) 04 August 1998, see abstract. 1		1	
Further documents are listed in the continuation of Box C. See patent family annex. * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance document published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US See patent family annex. "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is only inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is only inventive step when the document of particular relevance; the clai					
document defining the general state of the art which is not considered to be of particular relevance "E" earlier document published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "O" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family Date of mailing of the international search report 11 APR 2002 Authorized officer					
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US Considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such document, such combination being obvious to a person skilled in the art document member of the same patent family Date of mailing of the international search Paper 2002 Authorized officer	"A" document defining the general state of the art which is not the principle or theory underlying the invention considered to be of particular relevance		lication but cited to understand se invention		
being obvious to a person skilled in the art document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US Description of the international search Authorized officer	"L" document which may throw doubts on priority claim(s) or which is cited to extablish the publication date of another citation or other		considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be		
than the priority date claimed Date of the actual completion of the international search 26 FEBRUARY 2002 Name and mailing address of the ISA/US Date of mailing of the international search report 11 APR 2002 Authorized officer	me	ocument referring to an oral disclosure, use, exhibition or other combined with one or more other such documents, such combination being obvious to a person skilled in the art			
26 FEBRUARY 2002 Name and mailing address of the ISA/US Authorized officer Authorized officer	th	than the priority date claimed			
		•	,"	arch report	
Washington, D.C. 20231 Facsimile No. (703) 305-3230 SHIAN LUONG Paralegal Specialist Telephone No. (703) 308-Technology Center 3700	Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 SHIAN LUONG Paralegal Speci			hella Veney legal Specialist	

This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

BLACK BORDERS

IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

FADED TEXT OR DRAWING

BLURRED OR ILLEGIBLE TEXT OR DRAWING

SKEWED/SLANTED IMAGES

COLOR OR BLACK AND WHITE PHOTOGRAPHS

GRAY SCALE DOCUMENTS

LINES OR MARKS ON ORIGINAL DOCUMENT

REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

IMAGES ARE BEST AVAILABLE COPY.

☐ OTHER:

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.